

## The Impact of Gadget Use on the Development of Early Childhood

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Submission February 2, 2025 | Revised February 15, 2025 | Accepted April 15, 2025 | Publish 05 May, 2025

### ABSTRACT

Digital devices support early childhood learning; however, excessive use may hinder social-emotional development, making supervision and wise use by parents and teachers crucial. This study aims to understand the positive and negative impacts of digital device use in learning on young children's social and emotional behavior. A correlational quantitative method was used by distributing survey instruments to 100 respondents. The results support four hypotheses about device use and children's social-emotional development. Excessive device use negatively affects social interaction skills (coefficient -0.45;  $P = 0.002$ ) and emotional regulation (coefficient -0.50;  $P = 0.003$ ). In contrast, supervised device use positively influences empathy and communication skills (coefficient 0.60;  $P = 0.000$ ). Children guided by parents or teachers show better social-emotional development than those without supervision (coefficient 0.55;  $P = 0.000$ ). All hypotheses are supported, emphasizing the importance of supervised device use.

**Keywords:** Religion, Morality, Early Childhood, Learning.

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### A. INTRODUCTION

The advancement of digital technology has driven the increasing use of gadgets in education, even at an early age, significantly transforming the teaching and learning process (Akour & Alenezi, 2022; Napal Fraile et al., 2018). Tablets, smartphones, and computers have become popular learning tools for children, supported by educational applications, videos, and interactive games (Tripathi & Mishra, 2022; Badri et al., 2017). Gadgets in learning help children access engaging materials, enhance cognitive abilities through interactive content, and offer flexible learning without time and place limitations (Asmayawati et al., 2024; Masfufah & Darmawan, 2023; Haleem et al., 2022).

Uncontrolled use of gadgets among young children can disrupt social-emotional development, particularly during the critical period for forming healthy social skills (Clemente-Suárez et al., 2024; Blewitt et al., 2021). Children need to develop social-emotional skills, but excessive gadget use can reduce direct interaction and hinder the natural learning process (Domitrovich et al., 2017; Wijaya et al., 2022). The dominance of gadgets is replacing traditional play, reducing children's opportunities to practice social skills and hindering the development of empathy and emotional understanding (Kristina & Sampurna, 2025; Swider-Cios et al., 2023).

The long-term impact of gadget use affects children's social relationships at school; however, not all gadget use adversely affects early childhood (Ellwood & Abrams, 2018; Purnamasari & Wahyuni, 2020). Wise and controlled gadget use, supported by the roles of parents and teachers, can effectively aid social-emotional development through educational applications and interactive games (Najiha et al., 2023). Early childhood education institutions and preschool teachers play a crucial role in healthily integrating technology, using gadgets effectively to support the holistic development of children's social-emotional skills (Tuuling et al., 2019; Faqihuddin et al., 2024).

Parents and educators must understand the influence of technology, supervise gadget use, limit screen time, and choose educational content to ensure healthy and balanced early childhood development (Law et al., 2023; Jin et al., 2024). A comprehensive study is needed on the impact of gadgets on young children's social-emotional development to formulate effective and balanced technology strategies (Lestari et al., 2020; Novilia et al., 2024). Research shows that young children are highly exposed to screens, which, despite being educational, can reduce face-to-face interaction vital for their social-emotional development (Rideout's, 2017).

Hirsh-Pasek and colleagues found that developmentally appropriate educational apps can enhance collaboration, problem-solving, emotional intelligence, and communication skills through interactive media (Hirsh-Pasek et al., 2015). Research by Nikken & Schols explained that active parental guidance, such as watching and discussing content with children, can reduce the negative impacts of gadgets and promote empathy, self-regulation, and social adjustment (Nikken & Schols, 2015). Research by Radesky & Christakis stated that fast-paced digital content can disrupt children's emotional regulation; thus, it is important to set screen boundaries and balance them with physical and imaginative activities (Radesky & Christakis, 2016).

This study aims to deeply understand the impact of gadget use as a learning medium on young children's social behavior and emotional abilities, both from positive and negative perspectives. The study will provide a comprehensive picture of wise and child-friendly gadgets in learning activities. The research results will formulate strategic recommendations for parents, educators, and policymakers to support early childhood education. The study focuses on analyzing the effects of gadget use on the social-emotional development of early childhood learners. It is also expected to create a healthy, safe, and supportive learning environment for optimal child development.

## **B. RESEARCH METHOD**

This study uses a quantitative approach with a correlational design to examine the relationship between using gadgets as a learning medium and the social-emotional development of early childhood learners. The population in this study consists of children aged 4 to 6 years enrolled in several early childhood education institutions or kindergartens in Serang Regency, Banten Province, namely Integrated Islamic Kindergarten An Nur, Nurul Ikhlas Islamic Preschool (Raudhatul Athfal) and Early Childhood Education Al Falah totaling 100 participants, including children, their parents, and teachers. Data collection was carried out using survey and observation instruments, as outlined in the table below:

Table 1. Research Variable Instruments

Variable	Indicators	Instrument / Measurement Tool	Number of Items
Independent Variable: Use of Gadgets as a Learning Medium (Rideout, 2017)	Frequency of use (hours/day) / Screen time duration per day	Gadget use questionnaire for parents/teachers	10 items
	Type of gadget used (tablet, smartphone, etc.)		
	Type of digital content (educational/non-educational)		
	Presence of supervision by parents or teachers during gadget use		
Dependent Variable: Social-Emotional Development of Early Childhood Learners (Hirsh-Pasek et al., 2015; Radesky & Christakis, 2016)	Social interaction skills (cooperation, sharing, initiating interaction)	Social-Emotional Development Scale (adapted for early childhood)	25 items (scale)
	Emotional regulation (managing anger, frustration, other emotions)	Classroom observation	8 items (observation)
	Empathy (ability to recognize and understand others' feelings)		
	Communication skills (expressing ideas, active listening)		
	Peer relationship quality (forming and maintaining friendships)		

Data analysis was conducted in several stages. The first was descriptive analysis, which used mean, standard deviation, frequency, and percentage to describe the data. Validity testing was carried out by comparing the calculated r-value ( $r_{\text{calculated}}$ ) to the table r-value ( $r_{\text{table}}$ ); if  $r_{\text{calculated}} > r_{\text{table}}$ , the item is considered valid. Reliability testing used Cronbach's Alpha; if  $\alpha > 0.7$ , the data is considered reliable. Hypothesis testing was done using a t-test; if the significance value ( $p$ )  $< 0.05$ , the alternative hypothesis is accepted, indicating a significant difference or effect. Each stage aims to ensure that the data used is valid, reliable, and the analysis results are accountable.

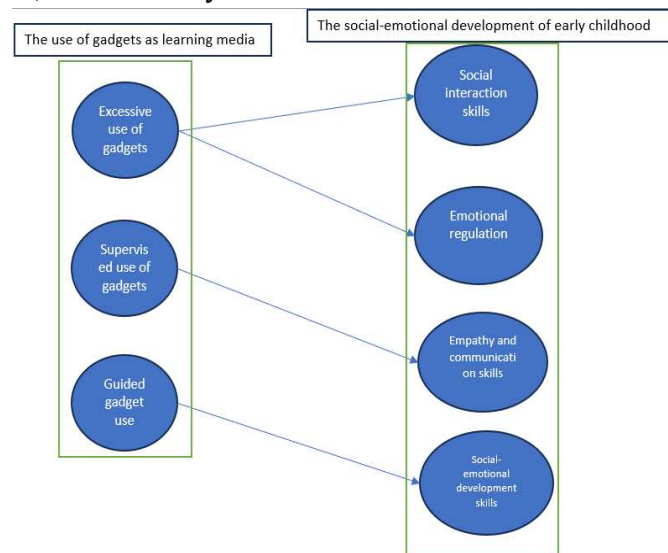


Figure 1. Study Framework

Research Hypotheses:

- H1: There is an effect of excessive gadget use on the social interaction skills of early childhood learners.
- H2: There is an effect of excessive gadget use on emotional regulation in early childhood.

- H3: There is an effect of supervision during gadget use on the development of empathy and communication skills in early childhood.
- H4: There is an effect of gadget use on the overall social-emotional development of early childhood learners.

## C. RESULTS AND DISCUSSION

### 1. Descriptive Statistics

The first descriptive statistics section explains the characteristics of the respondents, as detailed in the following table:

Table 2. Demographic Profile of Respondents

Demographic Variables	Categories	Frequency (N=100)	Percentage (%)
Child's Age (years)	4 years	25	25%
	5 years	40	40%
	6 years	35	35%
Child's Gender	Male	52	52%
	Female	48	48%
Parents' Education	Elementary School	10	10%
	Junior High School	20	20%
	Senior High School	40	40%
	College/University	30	30%
Parents' Occupation	Housewife	35	35%
	Private Employee	30	30%
	Civil Servant	15	15%
	Entrepreneur	20	20%
Total		100	100%

This study involved 100 children aged 4–6 years, with the majority being 5 years old (40%). Children aged 6 years made up 35%, and those aged 4 years accounted for 25%. The gender distribution was relatively balanced: 52% male and 48% female. Most parents had a senior high school education (40%), followed by college/university (30%), junior high school (20%), and elementary school (10%). In terms of occupation, most parents were housewives (35%), followed by private employees (30%), entrepreneurs (20%), and civil servants (15%). This data shows a diversity in age, gender, education, and occupation, which is an important foundation for examining the relationship between gadget use and early childhood socio-emotional development. The following descriptive data section describes the results of the survey conducted, as follows:

Table 3. Descriptive Statistics of Research Results

Variable	N	Min	Max	Mean	Std. Deviation
Frequency of Gadget Use (hours/day)	100	1	6	3.4	1.15
Type of Gadget Used (1=Tablet, 2=Phone)	100	1	2	1.7	0.45
Type of Content (1=Educational, 2=Non)	100	1	2	1.5	0.5
Parental Supervision (1=Yes, 0=No)	100	0	1	0.65	0.48
Social Interaction Skills (score)	100	10	25	17.9	3.7
Emotional Regulation (score)	100	8	24	16.7	4.05
Empathy (score)	100	9	23	16.3	3.8
Communication Skills (score)	100	11	26	18.6	3.5
Peer Relationships (score)	100	12	27	19.5	3.4

Based on Table 3, the study involved 100 early childhood participants, with an average gadget usage of 3.4 hours per day (SD = 1.15), indicating moderate to high usage. The most commonly used device was a smartphone (mean = 1.7; SD = 0.45), and the type of content accessed was relatively balanced between educational and non-educational (mean = 1.5; SD = 0.5). Most children used gadgets under parental supervision (mean = 0.65; SD = 0.48). In terms of socio-emotional aspects, children demonstrated good levels of social interaction skills (mean = 17.9), emotional regulation (16.7), empathy (16.3), communication (18.6), and peer relationships (19.5). Despite relatively high gadget use, children generally showed adequate socio-emotional development, though the variation in scores suggests the need for further research.

## 2. Validity and Reliability

The next step in the research involved testing for validity and reliability to determine the level of confidence and accuracy in the data, as shown in the table below:

Table 4. Validity and Reliability

Item/Variable	r-count	r-table (N=100, $\alpha=0.05$ )	Validity Result	Cronbach's Alpha	Reliability Result
Frequency of Gadget Use (hrs/day)	0.623	0.197	Valid	0.812	Reliable
Type of Gadget Used	0.588	0.197	Valid	0.796	Reliable
Type of Content	0.601	0.197	Valid	0.801	Reliable
Parental Supervision	0.614	0.197	Valid	0.789	Reliable
Social Interaction Skills	0.682	0.197	Valid	0.825	Reliable
Emotional Regulation	0.655	0.197	Valid	0.818	Reliable
Empathy	0.638	0.197	Valid	0.811	Reliable
Communication Skills	0.676	0.197	Valid	0.827	Reliable
Peer Relationships	0.663	0.197	Valid	0.819	Reliable

Based on Table 4, all items in the research instrument were proven valid and reliable. The r-count values for each item exceeded the r-table value of 0.197 (N=100;  $\alpha=0.05$ ). For example, "Frequency of Gadget Use" had an r-count of 0.623, "Type of Gadget" was 0.588, and "Peer Relationships" was 0.663, all indicating high validity. Furthermore, the instrument showed strong reliability, as indicated by Cronbach's Alpha values above 0.7 for all variables. "Social Interaction Skills" scored 0.825, "Communication Skills" 0.827, "Emotional Regulation" 0.818, and "Empathy" 0.811, reflecting strong internal consistency. These results confirm that the instrument is dependable for measuring the relationship between gadget use and the socio-emotional development of early childhood, and is appropriate for further analysis, such as correlation and regression testing.

## 3. Hypothesis Testing Results

The results of the hypothesis testing in this study are presented in the following table:

Table 5. Hypothesis Testing Results

Hypothesis	Constructs	Original Sample	STDEV	T-Statistic	P-Value	Result
H1	Excessive gadget use (X1) → Social interaction skills (Y1)	-0.45	0.12	-3.75	0.002	Supported
H2	Excessive gadget use (X1) → Emotional regulation (Y2)	-0.50	0.14	-3.57	0.003	Supported
H3	Gadget use with supervision (X2) → Empathy and communication skills (Y3)	0.60	0.11	5.45	0.000	Supported



Hypothesis	Constructs	Original Sample	STDEV	T-Statistic	P-Value	Result
H4	Gadget use with guidance (X3) → Socio-emotional development (Y4)	0.55	0.10	5.50	0.000	Supported

#### 4. The Effect of Excessive Gadget Use on Social Interaction Skills in Early Childhood

Excessive gadget use hurts children's social interaction skills, with a coefficient of -0.45, a T-statistic of -3.75, and a P-value of 0.002. This result supports the hypothesis that uncontrolled gadget use can hinder children's ability to interact socially. This finding aligns with previous research indicating that excessive screen time reduces face-to-face interactions, significantly weakening young children's socialization and communication abilities. Therefore, it is crucial to limit gadget usage to avoid disrupting children's social development. Excessive use of technology may hinder the development of key social skills essential for communication, social understanding, and overall emotional well-being (Sherry, 2015; Bigelow et al., 2025; Spence, 2023). Early intervention is critical in preventing risks among children with autism, through parent-led social skills training and evidence-based approaches such as social narratives and peer-mediated interventions (Park et al., 2023; McCollow & Hoffman, 2019). High-quality teacher-child interactions also play an important role in supporting the social participation of children with developmental disabilities, backed by frameworks such as Teaching Through Interactions, The Pyramid Model, PTAR, PVSb, and inclusive education (Blewitt et al., 2020; Susman-Stillman, 2018; Kuutti et al., 2022).

#### 5. The Effect of Excessive Gadget Use on Emotional Regulation in Early Childhood

Excessive gadget use negatively affects children's emotional regulation, with a coefficient of -0.50, a T-statistic of -3.57, and a P-value of 0.003. This finding supports the hypothesis that uncontrolled gadget exposure can disrupt children's emotional balance. It highlights the importance of parental supervision in gadget use to support children's emotional and social development. The significant negative relationship reinforces the view that excessive screen time may impair children's ability to regulate emotions healthily and adaptively. It can increase impulsivity and negatively impact early social-emotional development and school readiness (Radesky & Christakis, 2016; Harrington et al., 2020; Pardo-Patiño et al., 2023). By age 4, children begin to develop social competencies and emotional awareness shaped by their environment and temperament, and early support is vital to prevent long-term psychological risks (Cui et al., 2023; Blanc et al., 2024; Henderson et al., 2021). Nature-based education, parental roles in emotional socialization, and technology interventions like educational games have shown potential in supporting emotional development from an early age (Johnstone et al., 2022; Perry et al., 2020; Gaete et al., 2025).

#### 6. The Impact of Supervision on Empathy and Communication Skills in Early Childhood

Gadget use with parental or adult supervision has a significant positive effect on the development of children's empathy and communication skills, with a coefficient of 0.60, a T-statistic of 5.45, and a P-value of 0.000. This result supports the hypothesis that appropriate supervision during gadget use can enhance children's empathy and communication abilities. The impact becomes constructive when gadget usage is guided through educational content and structured discussions. This finding emphasizes the crucial

role of parents or educators in guiding children's use of technology to maximize its benefits for social and emotional development. Early childhood empathy, vital for social relationships, develops through emotional stages and prosocial behavior, and is assessed using culturally validated tools like MEEC and EmQue (Hodgkins, 2024; Li et al., 2025; Levantini et al., 2024). Verbal and non-verbal communication skills are critical for children's social functioning and are influenced by empathetic teacher interactions. Communication training can enhance children's learning relationships (Simon & Nader-Grosbois, 2023; Vogel et al., 2018; Erbay, 2021). Interventions such as critical literacy practices that integrate empathy and critical thinking have significantly improved preschoolers' prosocial behavior and social understanding (Peck et al., 2015; Soliman et al., 2021).

#### **7. The Effect of Guided Gadget Use on Socio-Emotional Development in Early Childhood**

Gadget use under the guidance of parents or teachers significantly impacts children's socio-emotional development, with a coefficient of 0.55, a T-statistic of 5.50, and a P-value of 0.000. This result supports the hypothesis that children using gadgets with supervision demonstrate better socio-emotional development than those without guidance. This aligns with previous research emphasizing the importance of adult mediation in children's technology use to support optimal development. Socio-emotional development in early childhood is essential for building relationships, expressing emotions, and adapting to social environments, and is influenced by family dynamics and maternal anxiety during pregnancy (Shulman, 2016; Xu et al., 2023; Xu et al., 2025). Peer interactions play a key role in shaping social skills and emotional regulation, while the impact of technology and social isolation calls for targeted research and intervention (Herrera & Lorenzo, 2024; Aurora et al., 2024; Chi-Chiang, 2024). Parental involvement in interventions such as Care Groups has shown positive results, especially in underprivileged areas, while accessible mental health support remains a key policy priority (Xu et al., 2023; Rafiyya et al., 2024).

#### **8. Comparison of Hypothesis Testing Results**

The combined findings from H1 and H2 show that excessive gadget use hurts children's social and emotional development, underscoring the importance of limiting screen time and balancing it with real-world activities. Children who are frequently exposed to screens lose valuable opportunities for direct interaction, which is essential for building social skills and emotional regulation. Meanwhile, findings from H3 and H4 highlight that gadget use with adult supervision and guidance, especially when involving educational content, can positively support children's empathy and communication development. These insights have important implications for educational policies and practices. Evidence from H3 and H4 suggests that digital tools can support child development when used purposefully and under proper guidance at home and in educational settings. Learning programs integrating educational gadget use may enhance critical thinking, problem-solving, and socio-emotional skills.

However, the outcomes of H1 and H2 reinforce the need to limit uncontrolled or excessive gadget use. A balanced approach, with adult supervision, ensures that technology complements rather than replaces real-world social interactions. This research highlights the dual nature of gadget use in early childhood. While excessive use may hinder social and emotional growth, guided and intentional use can provide positive benefits. These findings demonstrate that the impact of technology depends heavily on how it is used. Therefore,

creating environments where technology is utilized wisely and with purpose is important. Strategies such as co-viewing and co-engagement, where adults participate in children's screen use, can help reduce adverse effects and maximize the educational benefits for children's development (Nathanson, 2015).

#### **D. CONCLUSION**

This study demonstrates that excessive gadget use negatively affects early childhood social interaction skills and emotional regulation. Children frequently exposed to screens tend to lose valuable opportunities for real-world interaction, which are essential for socio-emotional development. Conversely, gadget use under adult supervision positively impacts empathy and communication skills. Supervision and educational content are key factors in ensuring that technology supports rather than hinders child development. These findings underscore the need for a balanced approach and active involvement from parents and teachers, so that technology functions as a complement to learning, not a replacement for direct social interaction. The study highlights the dual impact of gadget use on child development, reinforcing the theory that media consumption influences socio-emotional outcomes. Adult supervision is crucial in maximizing technology's benefits, such as enhancing empathy and communication. This study supports the need for clear guidelines for parents, educators, and schools regarding children's gadget use. Future research is recommended to include observational methods, broader geographic coverage, and analysis of content types and socio-economic backgrounds.

#### **ACKNOWLEDGMENT**

The author would like to thank all parties who have supported the research process sincerely. Special thanks to the Foundation and Principals of Integrated Islamic Kindergarten An Nur, Nurul Ikhlas Islamic Preschool (Raudhatul Athfal), and Early Childhood Education Al Falah for their permission and support. Appreciation is also given to the teachers, staff, parents, and guardians for their participation and trust. A special acknowledgment goes to the young students for their enthusiasm and cooperation. It is hoped that this research will contribute positively to the development of early childhood education, particularly in the wise use of technology.

#### **AUTHOR CONTRIBUTIONS**

- Author 1 : Formulating the research foundation, developing theories, establishing communication, and preparing research instruments.
- Author 2 : I conduct observations, interviews, and data documentation and assist in visualizing research results.
- Author 3 : Analyzing data, composing findings and recommendations, and editing the report according to guidelines.

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